ABSTRACT

Hydrogen barriers and fabrication methods are provided for protecting ferroelectric capacitors (C_{FE}) from hydrogen diffusion in semiconductor devices (102), wherein nitrided aluminum oxide (N-AlOx) is formed over a ferroelectric capacitor (C_{FE}), and one or more silicon nitride layers (112, 117) are formed over the nitrided aluminum oxide (N-AlOx). Hydrogen barriers are also provided in which an aluminum oxide (AlOx, N-AlOx) is formed over the ferroelectric capacitors (C_{FE}), with two or more silicon nitride layers (112, 117) formed over the aluminum oxide (AlOx, N-AlOx), wherein the second silicon nitride layer (112) comprises a low silicon-hydrogen SiN material.